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Title:

Charon's Size And Orbit From double Stellar Occultations

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Abstract:

Stellar occultations of a same star by both Pluto and Charon (double events) yield instantaneous relative positions of the two bodies projected in the plane of the sky, at ~10km-level accuracy. Assuming a given pole orientation for Charon's orbit, double events provide the satellite plutocentric distance r at a given orbital longitude L (counted from the ascending node on J2000 mean equator), and finally, constraints on its orbit.

A double event observed on 22 June 2008 provides $r=19,564\pm14$ km at $L=153.483\pm0.071$ deg. (Sicardy et al. 2011), while another double event observed on 4 June 2011 yields: $r=19,586\pm15$ km at $L=343.211\pm0.072$ deg. (all error bars at 1-sigma level). These two positions are consistent with a circular orbit for Charon, with a semi-major axis of $a=19,575\pm10$ km. This can be compared to the circular orbit found by Buie et al. (2012), based on Hubble Space Telescope data, with $a=19,573\pm2$ km.

The 4 June 2011 stellar occultation provides 3 chords across Charon, from which a radius of $R_c=602.4\pm1.6$ km is derived. This value can be compared to that obtained from the 11 July 2005 occultation: $R_c=606.0\pm1.5$ km (Person et al. 2006) and $R_c=603.6\pm1.4$ km (Sicardy et al. 2006).

A third double event, observed on 23 June 2011 is under ongoing analysis, and will be presented.

Buie et al. (2012), AJ 144, 15-34 (2012)

Person et al, AJ 132, 1575-1580 (2006)

Sicardy et al., Nature 439, 52-54 (2006)

Sicardy et al., AJ 141, 67-83 (2011)

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Category:

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